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Richard H. Bossi

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EXAMINER

MILLER, ROSE MARY

ART UNIT

PAPER NUMBER

2856

DATE MAILED: 06/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/734,452

Applicant(s)

BOSSI ET AL.

Examiner

Rose M. Miller

Art Unit

2856

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6, 9-12 and 15-22 is/are rejected.
- 7) ☒ Claim(s) 7, 8, 13 and 14 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 December 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 12/13/03
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Double Patenting

1. Applicant is advised that should claim 13 be found allowable, claim 14 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Objections

2. Claims 7-8 and 13-14 are objected to because of the following informalities: The claims recite "at least one detent" on line 2 of each claim and then recite "the detents" later on in the claims. These phrases are inconsistent in their pluralities and must be corrected. Either the claimed invention must have –at least two detents- to correspond with the two or more (or plurality) preset angles recited in the independent claims or "the detents" must be changed to reflect the use of the phrase "at least one detent" previously recited in the claim. Appropriate correction is required.

Drawings

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the rotating reflector directly reflecting the ultrasonic signal to and from the transducer when there is a fixed reflector also in communication with the channel for reflecting the ultrasonic signal (as found in claim 4) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure

Art Unit: 2856

is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1-5, 9-10, 17, and 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Cook et al. (US 4,807,476)** in view of **Cowan (US 3,121,324)** and **Dory (US 3,791,201)**.

With regards to claim 1, **Cook et al.** discloses an ultrasonic inspection device comprising a housing (12) defining a channel (see Figure 3) for the passage of an ultrasonic signal, a transducer (10) in communication with the housing for transmitting and receiving the ultrasonic signal therethrough, a rotating reflector (20) in communication with the channel to reflect the ultrasonic signal at two or more preset angles (hand held system operated to test fixture at 0°, 45°, and 90°, see Figure 4, column 2 lines 60 – column 3 line 2, and column 3 lines 15-34 and lines 50-63).

Cook et al. discloses the claimed invention with the exception of a locking mechanism to lock the rotating reflector at the preset angles.

Both **Cowan** and **Dory** teach utilizing locking means to fix the angle of reflection of an ultrasonic reflecting mirror. **Cowan** teaches utilizing a locking screw (38 and 39) for adjusting the rotation of the reflecting mirror while **Dory** teaches utilizing a screw (34) in combination with a spring (35) to adjust the angle of the reflective mirror. Both are to insure the ultrasound signal is transmitted into the testing object at a predetermined angle in order to provide the best testing results.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the system of **Cook et al.** with a locking mechanism to adjust or change the angle of reflection of the disclosed reflecting mirror as both **Cowan** and **Dory** teach the advantages of utilizing a locking mechanism to adjust the angle of reflection of a rotating mirror in order to provide the desired angle of reflection to provide the proper angle of incidence on the testing object.

With regards to claims 2-3, **Cook et al.** discloses a fixed reflector (19) in communication with the channel for reflecting the ultrasonic signal wherein the fixed reflector directly reflects the ultrasonic signal to and from the transducer (10) (see Figure 3).

With regards to claim 4, both **Cowan** and **Dory** disclose having the rotating reflector directly reflects the ultrasonic signal to and from the transducer in order to provide a circular scanning of the test object. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the system of **Cook et al.** with the ability to have the rotating reflector (20) directly reflect the

ultrasonic signal to and from the transducer in order to provide for a circular scanning of the test object as taught by both **Cowan** and **Dory**.

With regards to claim 5, while **Cook et al.** fails to specifically disclose the fixed reflector comprising a rod with a polished 45-degree bevel and the rotating reflector comprising a rod with a polished 45 degree bevel, it is inherent in the system disclosed by **Cook et al.** to utilize such polished rods as the reflectors as **Cook et al.** clearly discloses at column 2 lines 56-60 that a relative angle of ninety degrees with respect to each other. In order for this to be possible, each reflector (which clearly is in the shape of a rod) must have a bevel of 45 degrees at the reflecting end of the rod.

With regards to claims 9 and 10, **Cook et al.** clearly discloses the housing defining an arcuate aperture for the passage of the ultrasonic signal with a curve of at least 90 degrees in Figure 3.

With regards to claim 17, **Cook et al.** discloses positioning an ultrasonic inspection device proximate the component (22, 24, 26) to be inspected such that an aperture defined by the ultrasonic inspection device (water column, see Figure 13) opens towards the component (see column 3 lines 1-8), transmitting an ultrasonic signal through the ultrasonic inspection device (Figure 3) such that the ultrasonic signal reflects from the rotating reflector toward a portion of the component (see column 3 lines 1-8), moving the rotating reflector to another preset angle to facilitate inspection of another portion of the component (see column 3 lines 50-63), and transmitting additional ultrasonic signals through the ultrasonic inspection device such that the ultrasonic signal reflects from the rotating reflector toward an additional portion of the component (see column 3 lines 1-8 and 50-63).

Cook et al. discloses the claimed invention with the exception of locking the rotating reflector at a preset angle.

Both **Cowan** and **Dory** teach utilizing locking means to fix the angle of reflection of an ultrasonic reflecting mirror during the operation of an ultrasonic inspection system. **Cowan** teaches utilizing a locking screw (38 and 39) for adjusting the rotation of the reflecting mirror while **Dory** teaches utilizing a screw (34) in combination with a spring (35) to adjust the angle of the reflective mirror. Both are to insure the ultrasound signal

is transmitted into the testing object at a predetermined angle in order to provide the best testing results.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the system of **Cook et al.** with step of locking the reflecting mirror in order to adjust or change the angle of reflection of the disclosed reflecting mirror as both **Cowan** and **Dory** teach the advantages of locking the mirror to insure the desired angle of reflection of a rotating mirror which provides the proper angle of incidence on the testing object.

With regards to claims 21 and 22, **Cook et al.** discloses testing a portion of the component by rotating the rotating reflector to through the multiple present angles and then advancing the ultrasonic inspection device to a second location along the length of the component and repeating the transmission of the ultrasonic signals through the preset angles in order to provide a complete testing of the curved corner of the component (see column 3 lines 1-8 and 50-63). It would have been obvious to one of ordinary skill in the art at the time the invention was made to test the component with multiple paths by locking the reflector at preset angles and performing a pass for each preset angle as the test results would be the same – that of scanning the whole component. **Cook et al.** discloses utilizing a single pass with a motorized action of the reflector as that provides for a faster scanning of the test component. One of ordinary skill in the art would recognize that multiple hand scans, while slower, would produce the same test result or even a better test result as the operator could stop the test at a specific location in order to get multiple signals from the same defect or fault or if problems with the received ultrasonic signals are perceived.

7. Claims 6 and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Cook et al.** in view of **Cowan** and **Dory** as applied to claims 1 and 17, respectively, above, and further in view of **Hofstein (US 4,200,885)**.

With regards to claims 6 and 18, **Cook et al.** in view of **Cowan** and **Dory** fails to disclose a handle attached to the rotating reflector for rotation of the rotating reflector.

Hofstein teaches utilizing a knob handle to rotate or pivot a reflective mirror in order to provide the desired angle of incidence on the testing subject, both before the beginning of the testing cycle and during the testing cycle.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the system of **Cook et al.** with a handle in order to facilitate the hand rotation of the rotating mirror as taught by **Hofstein** to insure the proper angle of incidence is provided with the rotated mirror for each desired angle of incidence of the ultrasonic signals.

With regards to claim 19, **Cook et al.** discloses testing the component at three present angles (hand held system operated to test fixture at 0°, 45°, and 90°, see Figure 4, column 2 lines 60 – column 3 line 2, and column 3 lines 15-34 and lines 50-63). Therefore, it would have been obvious to one of ordinary skill in the art to rotate the handle to a third present angle in order to transmit additional ultrasonic signals into the component.

With regards to claim 20, **Cook et al.** discloses testing a portion of the component by rotating the rotating reflector to through the multiple present angles and then advancing the ultrasonic inspection device to a second location along the length of the component and repeating the transmission of the ultrasonic signals through the preset angles in order to provide a complete testing of the curved corner of the component (see column 3 lines 1-8 and 50-63).

8. Claims 11-12, 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Cook et al.** in view of **Cowan**, **Dory**, and **Hofstein**.

Cook et al. discloses the claimed invention with the exception of a handle attached to the rotating reflector for rotation of the rotating reflector and a locking mechanism to lock the rotating reflector at the preset angles.

Hofstein teaches utilizing a knob handle to rotate or pivot a reflective mirror in order to provide the desired angle of incidence on the testing subject.

Meanwhile, both **Cowan** and **Dory** teach utilizing locking means to fix the angle of reflection of an ultrasonic reflecting mirror. **Cowan** teaches utilizing a locking screw

Art Unit: 2856

(38 and 39) for adjusting the rotation of the reflecting mirror while **Dory** teaches utilizing a screw (34) in combination with a spring (35) to adjust the angle of the reflective mirror. Both are to insure the ultrasound signal is transmitted into the testing object at a predetermined angle in order to provide the best testing results.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the system of **Cook et al.** with a handle in order to facilitate the hand rotation of the rotating mirror as taught by **Hofstein** to insure the proper angle of incidence is provided with the rotated mirror and to provide the system of **Cook et al.** with a locking mechanism to adjust or change the angle of reflection of the disclosed reflecting mirror as both **Cowan** and **Dory** teach the advantages of utilizing a locking mechanism to adjust the angle of reflection of a rotating mirror in order to provide the desired angle of reflection to provide the proper angle of incidence on the testing object.

With regards to claim 12, while **Cook et al.** fails to specifically disclose the fixed reflector comprising a rod with a polished 45 degree bevel and the rotating reflector comprising a rod with a polished 45 degree bevel, it is inherent in the system disclosed by **Cook et al.** to utilize such polished rods as the reflectors as **Cook et al.** clearly discloses at column 2 lines 56-60 that a relative angle of ninety degrees with respect to each other. In order for this to be possible, each reflector (which clearly is in the shape of a rod) must have a bevel of 45 degrees at the reflecting end of the rod.

With regards to claims 15 and 16, **Cook et al.** clearly discloses the housing defining an arcuate aperture for the passage of the ultrasonic signal with a curve of at least 90 degrees in Figure 3.

Allowable Subject Matter

9. Claims 7-8 and 13-14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Art Unit: 2856

10. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record fails to teach and/or suggest an ultrasonic inspection device comprising, in combination with the other recited elements, a locking mechanism comprising a spring-loaded ball in the housing and at least one detent defined by the handle or rotating reflector for selectively receiving the spring-loaded ball to rotatably lock the rotating reflector, wherein the at least one detent corresponds with the preset angles.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Hayes (US 2,459,162) discloses an acoustical sound-locating device.

Kupperman et al. (US 4,361,044) discloses a scanning ultrasound probe.

Okado (US 4,541,434) discloses an ultrasonic scanning apparatus.

Kennedy et al. (US 4,848,159) discloses an ultrasonic inspection probe for laminated structures.

Woodmansee (US 4,862,748) discloses multiple ultrasonic transducers with remote selector.

Bashyam (US 5,203,869) discloses an ultrasonic flange radii inspection transducer device.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rose M. Miller whose telephone number is 571-272-2199. The examiner can normally be reached on Monday - Friday, 7:30 am to 3:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on 571-272-2208. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2856

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



RMM

16 June 2005



HEZRON WILLIAMS
SUPERVISORY PATENT EXAMINER
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